

to the time switch on the clock. The set will not become operative until the master switch has been closed by the removal of the counterpoise reel.

15. USE.

a. Radio Set AN/PRT-1 is most effective against enemy radio-telephone communication. The transmitters should be placed as close as possible to the enemy receivers (not more than $\frac{1}{2}$ mile away). If it is desired to jam enemy continuous-wave (c-w) signals, the number of Radio Sets AN/PRT-1 used must be considerably increased or placed in closer proximity to the enemy receiver. Table I shows the approximate jamming signal strength that can be expected from Radio Set AN/PRT-1 at various distances from the transmitter.

TABLE I. FIELD STRENGTH OF RADIO SET AN/PRT-1

No. of Radio Sets AN/PRT-1	Field strength (microvolts)				
	1/10 mile	2/10 mile	3/10 mile	4/10 mile	5/10 mile
1	50	24	20	10	8
2	95	47	39	19	15
3	141	70	56	28	21

b. The number of units required depends upon the strength of the enemy signals at the victim receiver. The jamming signal should be equal to, or greater than enemy signals. The field strength to be expected from various enemy radio sets is hard to predict. Table II gives the approximate transmitted field strength of Radio Set SCR-284, similar to some enemy equipment. The table may serve as a guide in deciding the number of Radio Sets AN/PRT-1 to be used, taking into account the distances involved.

TABLE II. FIELD STRENGTH OF TYPICAL RADIO SET (SCR-284)

Distance (miles)	Field strength (microvolts)
1	150
2	40
3	10
4	8
5	6
6	5
7	4

16. ANTENNA ARRANGEMENTS.

a. Figure 8 shows the antenna placed in a tree to provide a 90-foot vertical radiator. In actual use it may be impossible to achieve this height. However, every effort should be made to get the antenna as high as possible. The counterpoise should be unreeled and laid on the ground in a scrambled fashion about the unit. This arrangement will radiate the same signal strength in all directions.

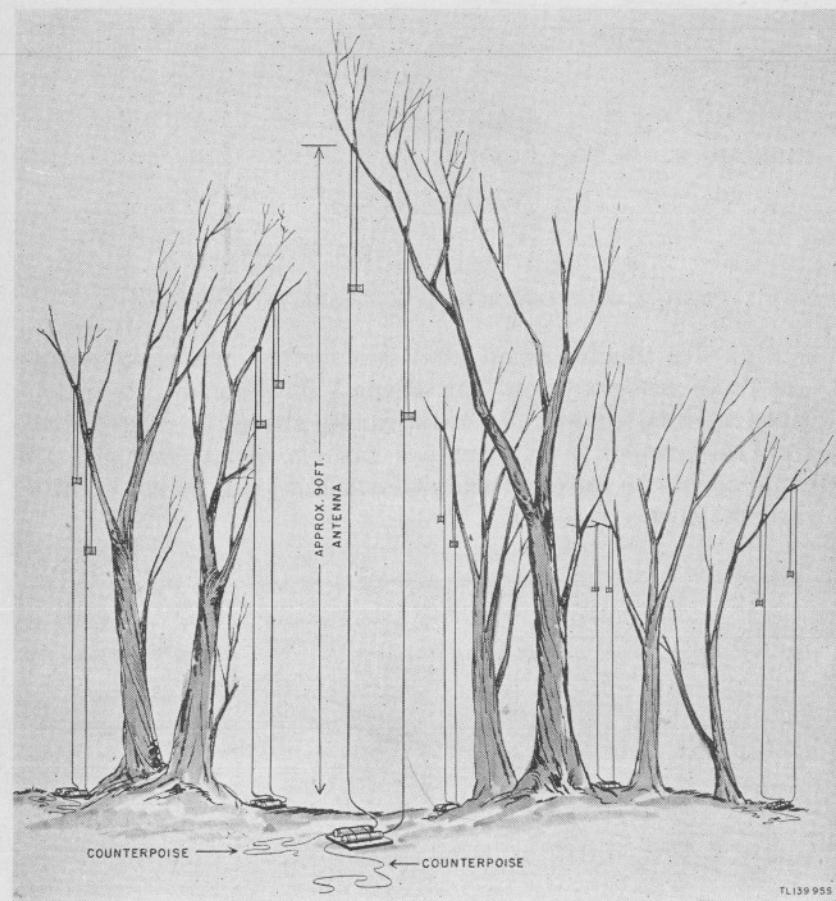


Figure 8. Vertical antenna arrangement.

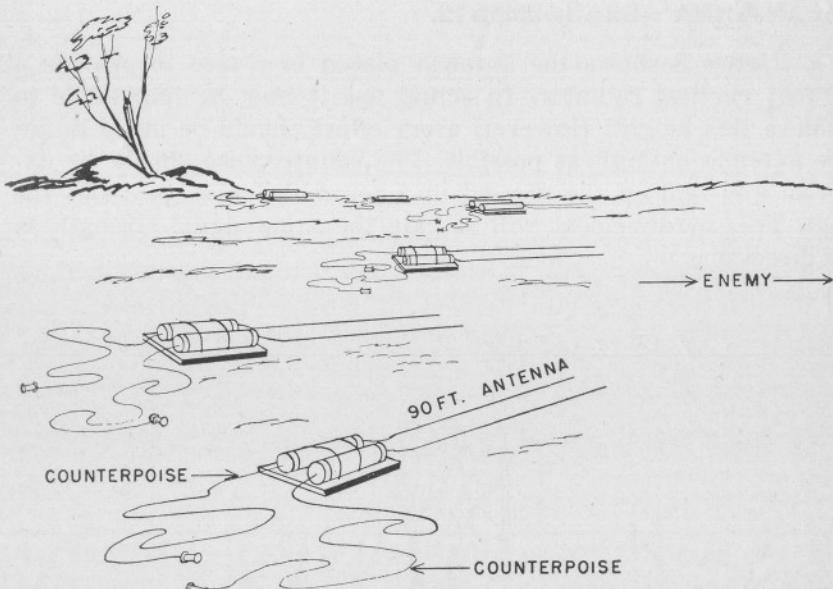


Figure 9. Alternate antenna arrangement, directional.

b. Figure 9 illustrates an alternate method useful in terrain where there are no trees. The general direction of the enemy receiver must be known. The counterpoise should be unreeled and laid on the ground in a scrambled fashion about the unit. The antenna should be unreeled and stretched out full length pointing toward the enemy receiver.

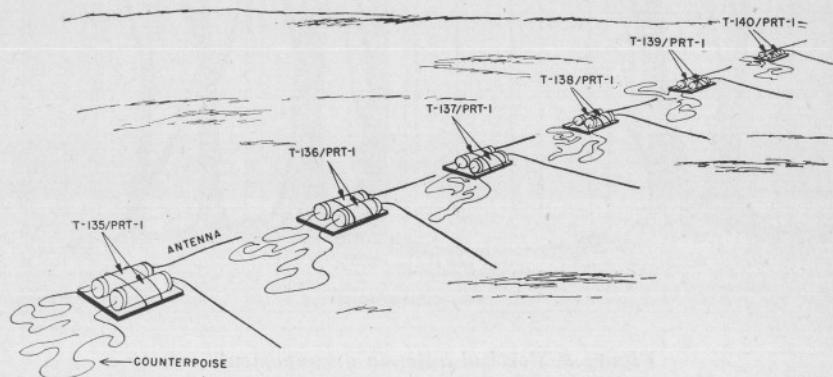


Figure 10. Alternate antenna arrangement, nondirectional.

c. Figure 10 shows an antenna arrangement which may be used when the direction of the enemy receiver is doubtful and no trees are nearby. It should be noted that at least two of each type transmitter must be used for this layout.

- (4) Turn the dial until the time of day is opposite pointer.
- (5) Tighten the knurled nut while holding the dial, making sure the white and black pointers are still in position.
- (6) Be sure the lever is moved to the TIME position.
- (7) Tear off the paper clock dial.
- (8) For an example of how to set the clock, see figure 6. The clock is set to start the unit at 1200 hours and to stop at 1600 hours. The time of day is 2000 hours.
- (9) After the clock has been set, reassemble the unit.

13. INSTANTANEOUS OPERATION INSTRUCTIONS.

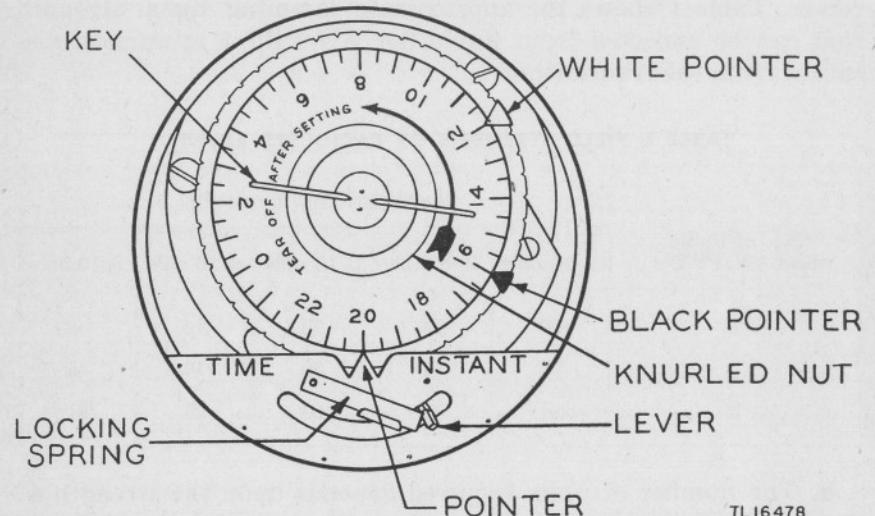


Figure 7. Time clock set for instantaneous operation.

The unit may be set for instantaneous operation; that is, set to operate the moment the counterpoise reel is removed.

- a. Move lever to INSTANT position.
- b. Lift up the locking spring and swing it downward until the spring locks in long slot.
- c. Tear off paper clock dial.
- d. Reassemble the unit.

14. MASTER SWITCH.

To prevent accidental operation of the transmitter, an automatic master switch is provided. The lever of the master switch is connected to the counterpoise reel by means of a piece of soft wire. When the counterpoise reel is removed, this wire closes the switch and then breaks, thus rendering the unit operative subject

c. At the completion of above test, set the master switch to the OFF position.

d. If a radio receiver is available, the following test is recommended:

(1) Tune the receiver to a frequency within the range of the units being tested.

(2) Select the units to be tested, and place them within 10 feet of the receiver.

(3) Throw lever on clock to INSTANT position (fig. 7).

(4) Throw master switch to ON position.

(5) If unit is operating properly, a roaring sound will be heard in the receiver.

(6) At the completion of above test, throw master switch to OFF position.

12. STARTING PROCEDURE FOR DELAYED OPERATION.

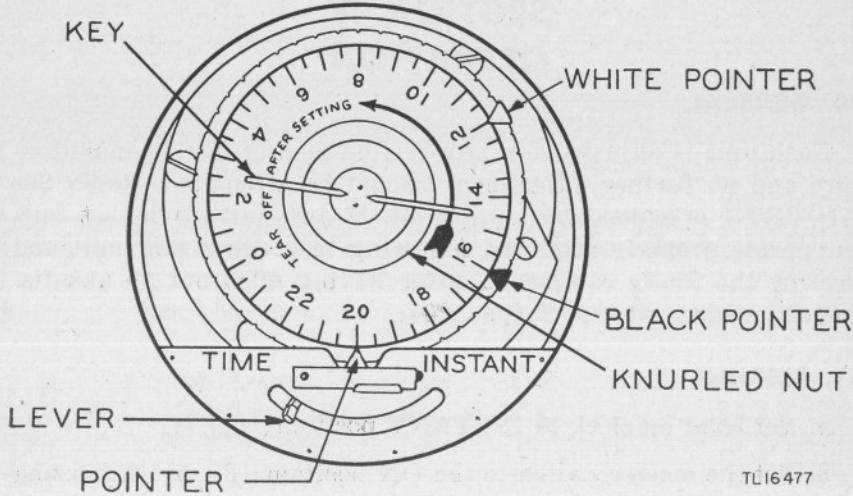
a. Each transmitter is equipped with a clock. The dial readings are standard Army-Navy time. Proper setting of the clock may delay the starting time of the operation for as long as 23 hours.

b. To set for *delayed action*, use the following procedure:

(1) Wind the clock with the key provided.

(2) Loosen the knurled nut one-fourth turn; set the white pointer to the time desired for the unit to start operating.

(3) Set the black pointer for the desired time for the operation to *stop*. The clock cannot be set for an operating time of less than $1\frac{1}{2}$ hours.



TL16477

Figure 6. Time clock set for delayed operation.

PART THREE

MAINTENANCE INSTRUCTIONS

NOT APPLICABLE

PART TWO

OPERATING INSTRUCTIONS

NOTE: For information on destroying the equipment to prevent enemy use, refer to the destruction notice at the front of the manual.

SECTION III

CONTROLS AND THEIR USE

9. TRANSMITTER CONTROLS (figs. 5, 6, and 7).

The controls for the transmitter unit consist of a master switch to control application of power, and four controls located on the clockface of each unit, as follows:

- a. A lever installed on the lower part of the clockface provides for instant or delayed operation.
 - b. On the front of the clock is a key for winding.
 - c. Two pointers are provided on the face of the clock for timing.
 - (1) The white pointer sets the time for operation to start.
 - (2) The black pointer sets the time for operation to stop.
-

SECTION IV

OPERATION

10. GENERAL.

Each unit is adjusted for proper functioning during manufacture and no further adjustment should be attempted. Radio Set AN/PRT-1 is expendable equipment. If any unit of the set fails to operate properly after the following test, use a new unit and destroy the faulty equipment, after having filled out an unsatisfactory equipment report (par. 20).

11. TESTING.

- a. Set lever on clock to INSTANT position (fig. 7).
- b. Set the master switch to the ON position (fig. 5). A buzzing sound should be heard.

PART FOUR
AUXILIARY EQUIPMENT

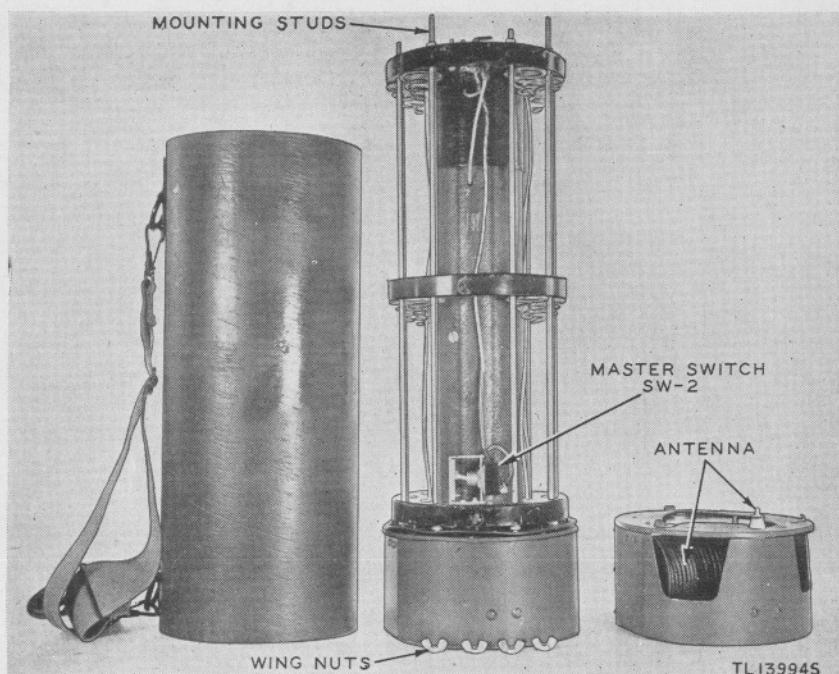


Figure 5. Transmitter unit, disassembled.

NOT USED

8. INSTALLATION OF BATTERIES.

- a. Have at hand 16 dry-cell Batteries BA-37.
- b. Stand the unit on a flat surface. **Place the end with the four wingnuts uppermost** (fig. 3).
- c. Unscrew the four wingnuts (fig. 3).
- d. Lift off the end plate and plywood case (figs. 4 and 5).
- e. Install batteries in the spaces provided, making sure that the positive end (small metal button terminal) is placed downward. The springs make contact with the negative ends.
- f. The transmitter is now ready to be tested.

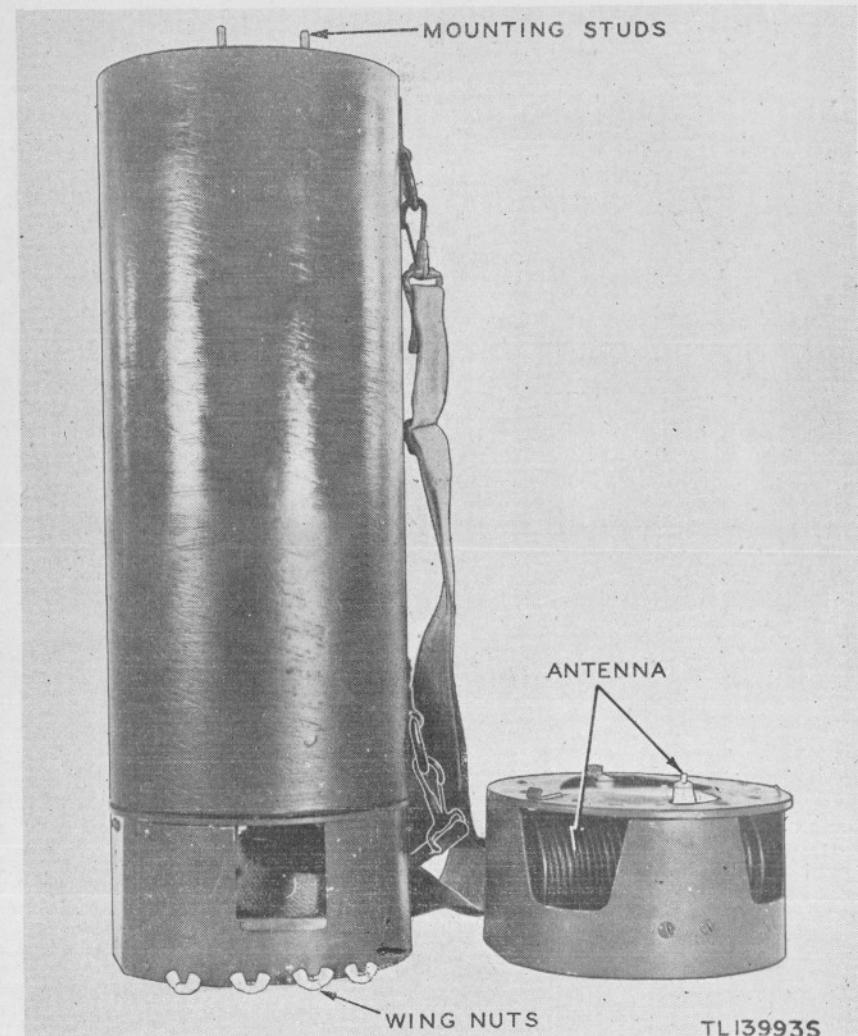


Figure 4. Transmitter unit, end plate removed.

SECTION II INSTALLATION OF RADIO SET AN/PRT-1

7. UNPACKING, UNCRATING, AND CHECKING.

Three boxes are used to ship Radio Set AN/PRT-1. Each box should be opened carefully with the proper tools. Steel strapping can be broken easily with a claw hammer or tin snips. Remove the nails from the lid of each box with a nail puller, wrecking bar, or claw hammer, and lift out the transmitters and packboard. Take each carton out of the export box before removing any packing or paper. Inspect each piece of equipment as soon as it is unpacked for any possible damage caused in shipment.

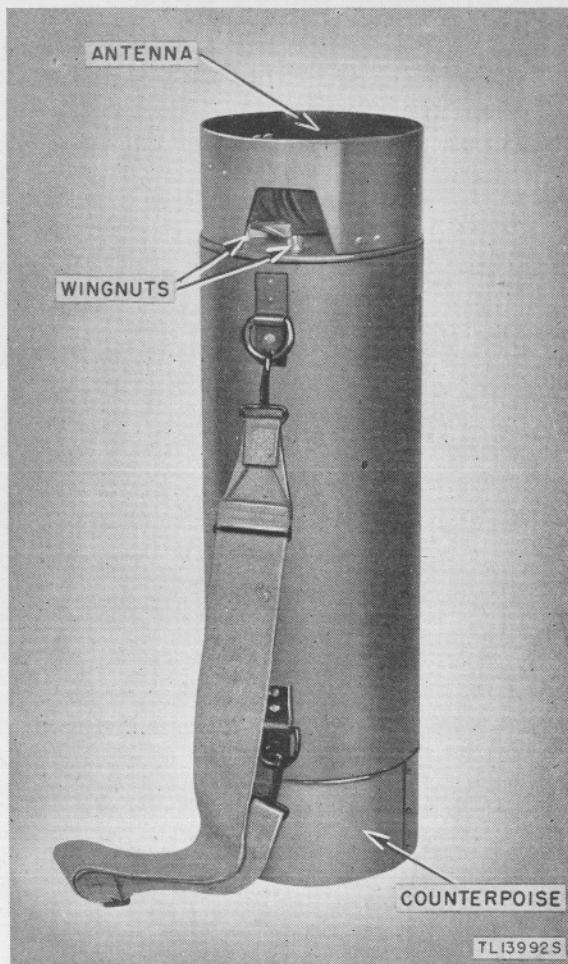


Figure 3. Transmitter unit, showing location of wingnuts.

PART FIVE REPAIR INSTRUCTIONS

NOTE: Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report); by Army Air Forces, on Army Air Forces Form No. 54 (Unsatisfactory Report). If either form is not available, prepare the data according to the sample form reproduced in figure 12.

SECTION V THEORY OF EQUIPMENT

17. GENERAL.

Each unit of this set is a simple spark transmitter which will jam enemy radio communications over a very wide band of frequencies. Thus, fewer transmitter units are required for jamming an extremely wide range of frequencies. Spark interference is particularly effective against amplitude-modulated signals, widely used by the enemy. Since the equipment is expendable and has a short life, the design of this equipment is as simple as possible.

18. SIMPLIFIED SCHEMATIC DIAGRAM.

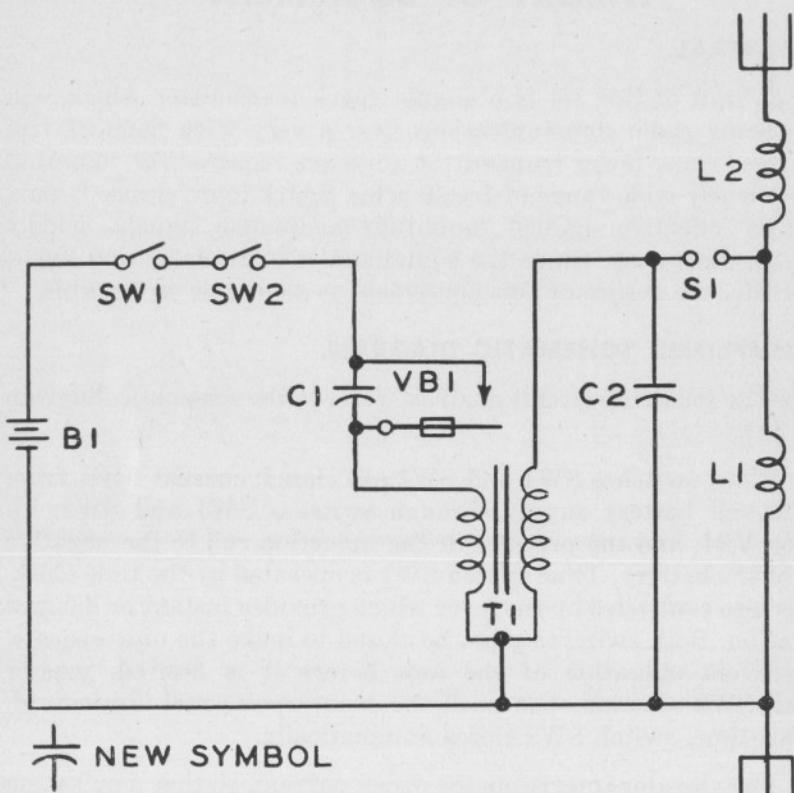
For the following circuit analysis, refer to the schematic diagram (fig. 11).

a. When switches SW1 and SW2 are closed, current flows from the 12-volt battery supply through switches SW1 and SW2, vibrator VB1, and the primary of the induction coil to the negative side of the battery. Time switch SW1 is operated by the time clock, and is also controlled by the lever which provides instant or delayed operation. Both switches must be closed to make the unit operate. To prevent operation of the unit before it is desired, master switch SW2 remains open until the counterpoise reel is removed. At this time, switch SW2 closes automatically.

b. The vibrator interrupts the direct current, so that a pulsating current flows through the primary of induction coil T1. Capacitor C1 reduces sparking at the vibrator points. The pulsating current in the primary induces a high voltage across the secondary of induction coil T1. This high voltage is applied across capacitor C2 which is part of the radio-frequency (r-f) oscillating circuit composed of coil L1 and capacitor C2. This high voltage breaks down the spark gap S1, so that capacitor C2 discharges through coil L1 and r-f oscillations occur in this circuit. These oscillations continue until the energy is dissipated and the spark gap becomes noncon-

ducting. At each successive high-voltage pulse from the induction coil secondary, the spark gap breaks down and r-f oscillations occur.

c. As a result of this action, a series of damped waves are generated by the transmitter. The average frequency of the oscillations is determined by the resonant frequency of the oscillatory circuit C2 and L1. The r-f power generated by the transmitter is fed to the antenna system composed of a straight-wire antenna and a counterpoise. Coil L2 is used on low-frequency Radio Transmitters T-135/PRT-1, T-136/PRT-1, and T-137/PRT-1 as a loading coil which electrically lengthens the antenna.



NOTE: COIL L2 IS USED ON RADIO TRANSMITTERS T-135/PRT-1, T-136/PRT-1, AND T-137/PRT-1. COIL L2 IS OMITTED ON RADIO TRANSMITTERS T-138/PRT-1, T-139/PRT-1 AND T-140/PRT-1.

TL 15947A

Figure 11. Transmitter unit, schematic diagram.

moistureproof foil bag. The units are then placed in paper cartons and packed two each in wooden export boxes.

b. Packed for Domestic and Export Shipping.

Box No.	Required No.	Height (in.)	Depth (in.)	Length (in.)	Gross weight (lb.)
1	1	15	20	32	70
2	1	15	20	32	70
3	1	15	20	32	70

6. DESCRIPTION OF MAJOR COMPONENTS.

Radio Transmitters T-135/PRT-1, T-136/PRT-1, T-137/PRT-1, T-138/PRT-1, T-139/PRT-1, and T-140/PRT-1 are identical except for frequency range. The transmitter unit consists of a spark transmitter, batteries, a counterpoise, and an antenna assembly built into a unit. Refer to figures 2 and 5.

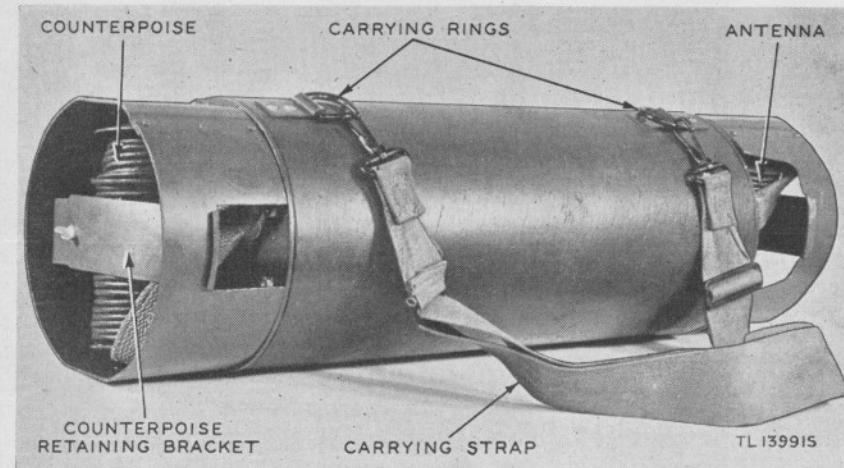


Figure 2. Radio Set AN/PRT-1, transmitter unit.

Counterpoise straight-wire
 Number of tubes none
 Type of transmitter spark
 Power output 1.5 to 4 watts depending
 on frequency: lower
 output at higher fre-
 quencies.
 Power supply Batteries BA-37, 16 re-
 quired for each trans-
 mitter; 96 required for
 complete Radio Set
 AN/PRT-1.

4. TABLE OF COMPONENTS.

NOTE: This list is for general information only. See appropriate publications for information pertaining to requisition of spare parts.

Component	Required No.	Diameter (in.)	Length (in.)	Weight (lb.)
Package 1:				
Radio Transmitter T-135/PRT-1	1	6½	22⁵/₈	18
Radio Transmitter T-136/PRT-1	1	6½	22⁵/₈	18
Packboard	1	15*	25½	6½
Package 2:				
Radio Transmitter T-137/PRT-1	1	6½	22⁵/₈	18
Radio Transmitter T-138/PRT-1	1	6½	22⁵/₈	18
Packboard	1	15*	25½	6½
Package 3:				
Radio Transmitter T-139/PRT-1	1	6½	22⁵/₈	18
Radio Transmitter T-149/PRT-1	1	6½	22⁵/₈	18
Packboard	1	15*	25½	6½

* Width measurement.

NOTE: Batteries are not shipped with set.

5. PACKAGING DATA.

a. **General.** Radio Set AN/PRT-1 is packed in three boxes. Each transmitter is padded and wrapped with paper and put into a

LEGEND

Radio Transmitter T-135

B1 12-v dry-cell battery
 C1 0.5-mf, 600-v capacitor
 C2 0.005-mf capacitor (composed
 of two 0.01-mf capacitors)
 1,600-v
 L1 4.38-uh inductor
 L2 11.1-uh inductor
 S1 Spark gap
 SW1 Time switch
 SW2 Master switch
 T1 Induction coil:
 Primary, 420 uh
 Secondary, 3.24 h

Radio Transmitter T-137

B1 12-v dry-cell battery
 C1 0.5-mf, 600-v capacitor
 C2 0.0025-mf capacitor (composed
 of four 0.01-mf capacitors)
 1,600-v
 L1 2.16-uh inductor
 L2 1.44-uh inductor
 S1 Spark gap
 SW1 Time switch
 SW2 Master switch
 T1 Induction coil:
 Primary, 420 uh
 Secondary, 3.24 h

Radio Transmitter T-136

B1 12-v dry-cell battery
 C1 0.5-mf, 600-v capacitor
 C2 0.0033-mf capacitor (composed
 of three 0.01-mf capacitors)
 1,600-v
 L1 3.09-uh inductor
 L2 4.54-uh inductor
 S1 Spark gap
 SW1 Time switch
 SW2 Master switch
 T1 Induction coil:
 Primary, 420 uh
 Secondary, 3.24 h

Radio Transmitter T-138

B1 12-v dry-cell battery
 C1 0.5-mf, 600-v capacitor
 C2 0.00175-mf capacitor (composed
 of four 0.007-mf capacitors)
 1,600-v
 L1 1.59-uh inductor
 S1 Spark gap
 SW1 Time switch
 SW2 Master switch
 T1 Induction coil:
 Primary, 420 uh
 Secondary, 3.24 h

Radio Transmitter T-139

B1 12-v dry-cell battery
 C1 0.5-mf, 600-v capacitor
 C2 0.0012-mf capacitor (composed
 of five 0.006-mf capacitors)
 1,600-v
 L1 1.03-uh inductor
 S1 Spark gap
 SW1 Time switch
 SW2 Master switch
 T1 Induction coil:
 Primary, 420 uh
 Secondary, 3.24 h

Radio Transmitter T-140

B1 12-v dry-cell battery
 C1 0.5-mf, 600-v capacitor
 C2 0.00083-mf capacitor (com-
 posed of six 0.005-mf
 capacitors) 1,600-v
 L1 0.66-uh inductor
 S1 Spark gap
 SW1 Time switch
 SW2 Master switch
 T1 Induction coil:
 Primary, 420 uh
 Secondary, 3.24 h

SECTION VI
TROUBLE SHOOTING
NOT APPLICABLE

SECTION VII
REPAIRS

19. GENERAL.

Since Radio Set AN/PRT-1 is an expendable item, no repair instructions are required. Defective equipment should be destroyed, after determining that no batteries have been left in the unit.

20. UNSATISFACTORY EQUIPMENT REPORT.

a. When trouble in equipment used by Army Ground Forces or Army Service Forces occurs more often than repair personnel feel is normal, War Department Unsatisfactory Equipment Report, W.D., A.G.O. Form No. 468, should be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C.

b. When trouble in equipment used by Army Air Forces occurs more often than repair personnel feel is normal, Army Air Forces Form No. 54 should be filled out and forwarded through channels.

c. If either form is not available, prepare the data according to the sample form reproduced in figure 12.

SECRET

PART ONE
INTRODUCTION

SECTION I
DESCRIPTION OF RADIO SET AN/PRT-1

1. GENERAL.

Radio Set AN/PRT-1 is an expendable barrage-type jammer for use against enemy radio communications. The radio set transmits continuous broad-band spark signals effective over a very wide frequency range. Two transmitters are carried on a standard Quartermaster packboard, three of which are supplied with each Radio Set AN/PRT-1 (fig. 1). If the use of the packboard is not desirable, the transmitters may be carried by means of a shoulder sling supplied with each unit. Preset time operation is provided by a timer mechanism, or the units may be set to operate immediately after placement.

2. APPLICATION.

a. General. Radio Set AN/PRT-1 consists of a group of six units which cover a frequency band of 950 to 7,000 kilocycles (kc). The six units are intended to be used in a group.

b. Power Source. For each transmitter sixteen dry-cell Batteries BA-37 connected in series-parallel to supply 12 volts, give an operating life of 4 hours. Ninety-six Batteries BA-37 are required for Radio Set AN/PRT-1.

3. TECHNICAL CHARACTERISTICS OF RADIO SET AN/PRT-1.

Frequency range:

Radio Transmitter T-135/PRT-1.....	950 to 1,330 kc
Radio Transmitter T-136/PRT-1.....	1,330 to 1,850 kc
Radio Transmitter T-137/PRT-1.....	1,850 to 2,580 kc
Radio Transmitter T-138/PRT-1.....	2,580 to 3,600 kc
Radio Transmitter T-139/PRT-1.....	3,600 to 5,020 kc
Radio Transmitter T-140/PRT-1.....	5,020 to 7,000 kc
Type of signal emitted.....	damped wave
Antenna	straight-wire

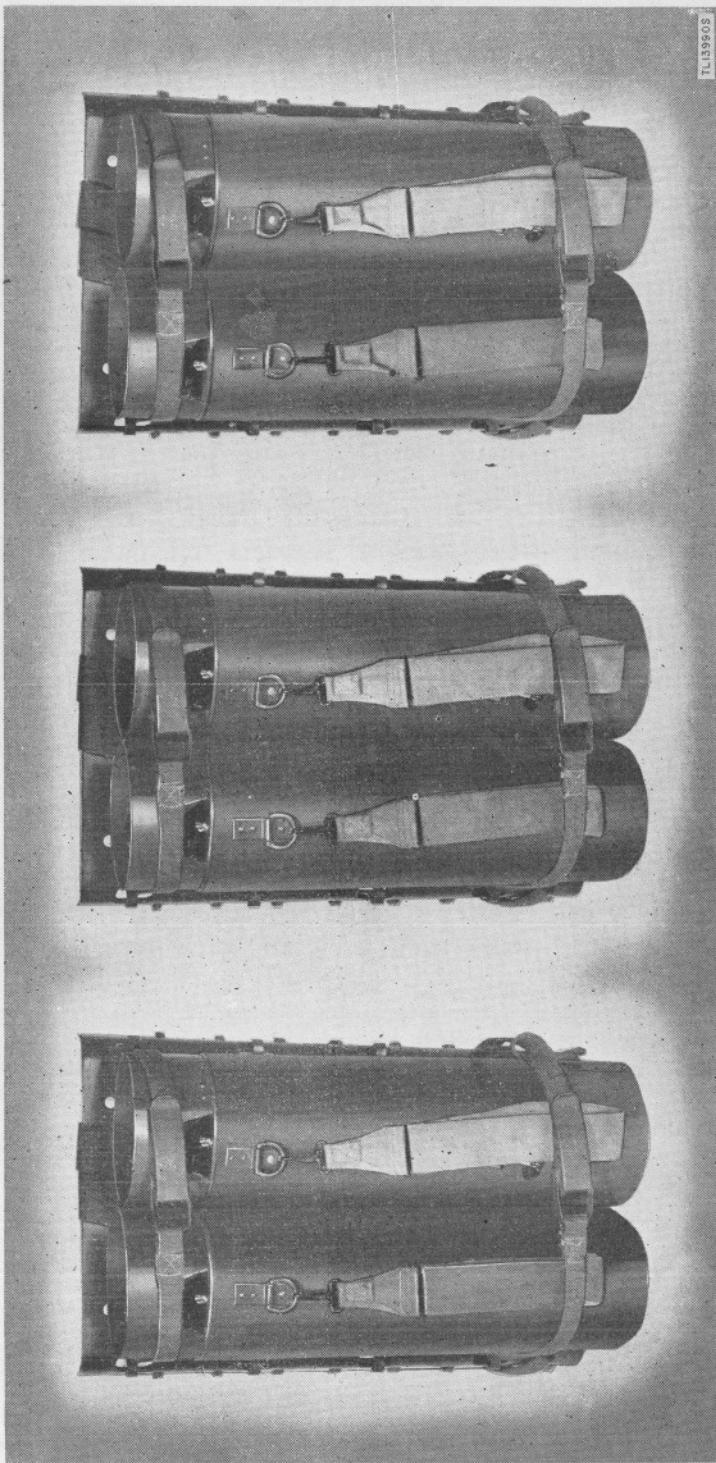


Figure 1. Radio Set AN/PRT-1.

TL139585

WAR DEPARTMENT UNSATISFACTORY EQUIPMENT REPORT						
FOR	TECHNICAL SERVICE Signal Corps	MATERIEL	DATE 1 Feb 45			
FROM	ORGANIZATION 175 Signal Repair Co	STATION	STATION APO 102			
TO	NEXT SUPERIOR HEADQUARTERS Supply Sec, Hq Fourth Army Sig Sv	STATION	TECHNICAL SERVICE Signal Corps			
COMPLETE MAJOR ITEM						
NOMENCLATURE Radio Transmitter BC-123-A		TYPE Ground, vehicular	MODEL A			
MANUFACTURER	U. S. A. REG. NO. Order No.		SERIAL NO.	DATE RECEIVED		
American Radio Corp		1234-Phila-45		12345	5 Jan 45	
EQUIPMENT WITH WHICH USED (If applicable) Radio Set SCR-456-A in Tank, Medium, MA						
DEFECTIVE COMPONENT—DESCRIPTION AND CAUSE OF TROUBLE						
PART NO. Sig C		TYPE Capacitor C20;fixed	MANUFACTURER	DATE INSTALLED		
Stk No. 3847-2		1-mf; 500 vdcw	American Radio Corp	When manufactured		
DESCRIPTION OF FAILURE AND PROBABLE CAUSE (If additional space is required, use back of form) Capacitor C20 shorts out due to humid operating conditions						
DATE OF INITIAL TROUBLE	TOTAL TIME INSTALLED			TOTAL PERIOD OF OPERATION BEFORE FAILURE		
15 Jan 45	-	-	-	YEARS 0	MONTHS 0	DAYS 5
HOURS - MILES - ROUNDS -						
BRIEF DESCRIPTION OF UNUSUAL SERVICE CONDITIONS AND ANY REMEDIAL ACTION TAKEN Operation in tropics; heavy rainfall. Was replaced and set given moistureproofing and fungiproofing treatment, 20 Jan 45.						
TRAINING OR SKILL OF USING PERSONNEL RECOMMENDATIONS (If additional space is required, use back of form)						
POOR	FAIR	GOOD	Substitute capacitor designed for tropical operation			
ORIGINATING OFFICER						
TYPED NAME, GRADE, AND ORGANIZATION E.A. Wilson, 1st Lt, Sig C 175 Signal Repair Co			SIGNATURE E. A. Wilson			
FIRST ENDORSEMENT						
TO CHIEF	TECHNICAL SERVICE	OFFICE				
NAME, GRADE, AND STATION		STATION		DATE		
Instructions						
<ol style="list-style-type: none"> It is imperative that the chief of technical service concerned be advised at the earliest practical moment of any constructional, design, or operational defect in matériel. This form is designed to facilitate such reports and to provide a uniform method of submitting the required data. This form will be used for reporting manufacturing, design, or operational defects in matériel, petroleum fuels, lubricants, and preserving materials with a view to improving and correcting such defects, and for use in recommending modifications of matériel. This form will not be used for reporting failures, isolated material defects or malfunctions of matériel resulting from fair-wear-and-tear or accidental damage nor for the replacement, repair or the issue of parts of equipment. It does not replace currently authorized operational or performance records. Reports of malfunctions and accidents involving ammunition will continue to be submitted as directed in AR 750-10 (change No. 3). It will not be practicable or desirable in all cases to fill all blank spaces of the report. However, the report should be as complete as possible in order to expedite necessary corrective action. Additional pertinent information not provided in the blank spaces should be submitted as inclosure to the form. Photographs, sketches, or other illustrative material are highly desirable. When cases arise where it is necessary to communicate with a chief of service in order to assure safety to personnel, more expeditious means of communication are authorized. This form should be used to confirm reports made by more expeditious means. This form will be made out in triplicate by using or service organization. Two copies will be forwarded direct to the technical service; one copy will be forwarded through command channels. Necessity for using this form will be determined by the using or service troops. 						
<small>W. D., A. G. O. Form No. 468 30 August 1944</small>						
<small>This form supersedes W. D., A. G. O. Form No. 468, 1 December 1943, which may be used until existing stocks are exhausted.</small>						
<small>U. S. GOVERNMENT PRINTING OFFICE 10-41548-1</small>						

Figure 12. W.D., A.G.O. Form No. 468 with sample entries.

DESTRUCTION NOTICE

WHY —To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN —When ordered by your commander.

- HOW** —
1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.
 2. Cut —Use axes, handaxes, machetes.
 3. Burn —Use gasoline, kerosene, oil, flame throwers, incendiary grenades.
 4. Explosives—Use firearms, grenades, TNT.
 5. Disposal —Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

- WHAT** —
1. Smash—Batteries, reels, transformer, clock, switch, spark gap, coils, and capacitors.
 2. Cut —Wires and rope.
 3. Burn —Housing, technical manuals.
 4. Bury or scatter—Any or all of the above pieces after breaking.

DESTROY EVERYTHING

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NOT APPLICABLE

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APPENDIX

SECTION IX REFERENCES

21. PUBLICATIONS.

- SIG 4-1 Allowances of Expendable Supplies
SIG 4-2 Allowances of Expendable Supplies for Schools,
Training Centers, and Boards
SB 11-6 Dry Battery Supply Data
TB SIG 5 Defense against Radio Jamming
TM 1-455 Electrical Fundamentals
TM 11-455 Radio Fundamentals

22. FORMS.

- W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report).
Army Air Forces Form No. 54 (Unsatisfactory Report).

23. ABBREVIATIONS.

c-w	continuous-wave
h	henry
in.	inch
kc	kilocycle
lb	pound
mf	microfarad
uh	microhenry
r-f	radio-frequency
v	volt

24. GLOSSARY.

Refer to glossary in TM 11-455.

SECTION X MAINTENANCE PARTS

25. MAINTENANCE PARTS FOR RADIO SET AN/PRT-1.

This radio set is 100 percent expendable; it is used once and then destroyed. Therefore there are no maintenance parts for this equipment.

Order No. 2555-MPD-45; 5895 copies; 16 June 45

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TM 11-259, Radio Set AN/PRT-1, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

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AN/PRT-1



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